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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,023	06/07/2005	Toshihiro Iwakuma	28955.4027	8877
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STEP TOE & JOHNSON LLP 1330 CONNECTICUT AVENUE, N.W. WASHINGTON, DC 20036			EXAMINER NELSON, MICHAEL E	
			ART UNIT	PAPER NUMBER
			1794	
			MAIL DATE	DELIVERY MODE
			03/20/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/538,023

**Applicant(s)**

IWAKUMA ET AL.

**Examiner**

MICHAEL E. NELSON

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1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-824)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date See Continuation Sheet

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :06/07/2005, 01/02/2008, 02/04/2008.

### **DETAILED ACTION**

1. Applicant's election of the structure wherein  $X_3$  is Nitrogen (group 2), and  $X_1$ - $X_2$  and  $X_4$ - $X_8$  are carbon (group 1), and where  $R_1$ - $R_8$  are L, wherein L is hydrogen or linear or branched alkyl, and  $R_9$  is -L-Y, where L is substituted or unsubstituted arylene (group 11), and Y is substituted or unsubstituted heterocyclic (group 17) in the reply filed on 01/02/2008 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claim 5 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 01/02/2008.

### ***Information Disclosure Statement***

3. The information disclosure statement filed 02/04/2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

### ***Claim Objections***

4. Claim 6 is objected to because of the following informalities:

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5. The 'beta' from the carbolinyl group is missing, likely due to a font conversion error, and should be replaced.
6. Appropriate correction is required.

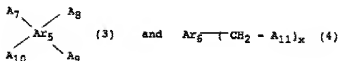
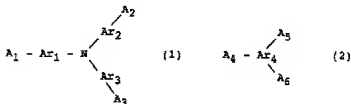
### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

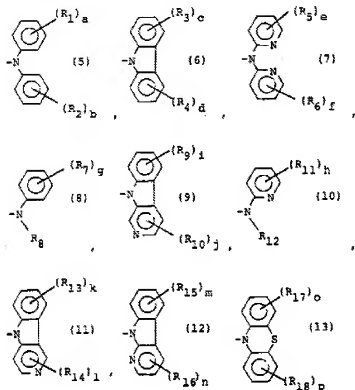
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 6-10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Noguchi et al. (EP 517542).
9. Concerning claims 1-4, and 6-8, Noguchi et al. describe organic electroluminescent devices comprising a luminous material and a hole transport material, where the hole transport material is given by one of the following structures:

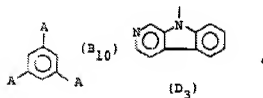


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Where A<sub>1</sub>-A<sub>11</sub> are one of the structures shown below. (Abstract, page 3, line 37-page 4 line 45.)

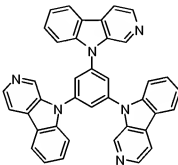


10. Noguchi et al. specifically disclose the following example core structure, where A is one of a limited number of substituent, including the second structure shown below. (page 7)



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11. Given this teaching, one of ordinary skill would immediately envisage the compound shown below, which is identical to Applicant's compound (19) on page 13 of the specification.



12. This compound meets the limitations of claim 1 where  $X_3$  is Nitrogen (per claims 3 and 4), and  $R_1$ - $R_8$  are L = hydrogen, and  $R_9$  is  $-L-Y$  where L is phenylene (arylene), and Y is heterocyclic, specifically  $\beta$ -carbolinyl (per claims 2 and 6).

13. Concerning claims 7 and 8, Noguchi et al. do not disclose the singlet or triplet energy gap of the compound, but the singlet and triplet energy gaps are an inherent feature of the compound itself, and is based upon the degree of conjugation of compound. Applicant discloses the triplet energy for a close analog (compound A-10 on page 50 and Table 1-1, also envisioned by Naguchi et al.), which has a triplet energy of 3.1 eV and a singlet energy of 3.7 eV respectively. Given the close similarity in structure, it would be reasonable to predict that the singlet and triplet energy of the compound shown above would be very close, and would therefore fall in the range of a triplet energy of 2.5 to 3.3 eV (per claim 7) and a single energy of 2.8 to 3.8 eV (per claim 8).

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14. Concerning claims 9-10 and 12, Noguchi et al. describes organic electroluminescent devices comprising a cathode, and anode and an organic thin film layer sandwiched between the cathode and anode. The materials described by Noguchi et al. are used either in the hole transport layer (per claim 12) or in the luminous layer, (per claim 10) (Noguchi et al., claims 1 and 6). Given this teaching, one of ordinary skill would immediately envisage a device where the material shown above was used in either the luminous layer, or in the hole transport layer.

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

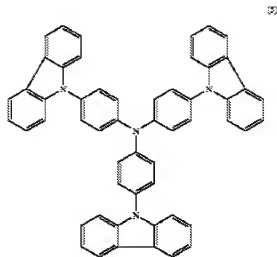
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 2002/0081456) in view of Naguchi et al. (EP 517542)

17. Concerning claim 11, Hamada describes organic electroluminescent elements where an electron transport layer includes an electron transport material and a carrier transportable dopant up to 50% by weight. Of the carrier transportable dopants, Hamada specifically discloses TCTA, shown below. ([0049], example 2 [0080]).



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18. Hamada is silent on the use of a carboline compound, instead of a carbazole compound.

19. Naguchi et al. describes the compound TCTA shown above (See example 7, page 16), and its use in an organic electroluminescent device. Naguchi et al. describes several hole transporting materials with similar functions, including the tri-carbolynyl benzene compound discussed in paragraph 11 above. Given this teaching, it would have been obvious to one of ordinary skill in the art to use the tri-carbolynyl benzene compound in the electron transport layer as described by Hamada since the compound would be predicted to function in the same manner as TCTA.

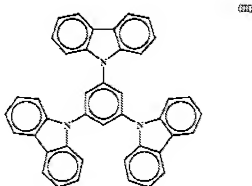
20. Claims 13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. (EP 517542) as applied to claim 9 above, and further in view of Thoms et al. (US 2003/0205696).

21. Concerning claims 13, 15 and 16, Noguchi et al. describe the organic electroluminescent device discussed above, comprising an anode, cathode, and either

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a hole transporting layer, or light emitting layer comprising the material discussed above with regard to claim 1. Noguchi et al. are silent on the use of the material as a host material, or where the light emitting layer comprises a phosphorescent emissive compound, or where the device emits bluish light.

22. Thoms et al. describes guest-host electroluminescent systems where the host material has a single ring core, which has a large band gap and high energy triplet excited states to permit short-wavelength (i.e. blue) phosphorescent emission by an associated guest material (abstract). Thoms et al. specifically discloses as an example of a host compound having a small core, the tricarbazole benzene structure shown below, which is also disclosed by Noguchi et al. Thoms et al. further discloses phosphorescent dopants, such as Irppy3, and blue emitting phosphorescent dopants as suitable light emitting materials [0047].



23. Given the close similarity in structure, and the fact that both compounds are disclosed by Noguchi et al., it would have been obvious to one of ordinary skill in the art to use the tri-carboninyl benzene compound discussed originally as a host material (per claim 13), for a phosphorescent dopant (per claim 15), in an electroluminescent device

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with a blue phosphorescent dopant to emit blue light (per claim 16), since the material would predicted to function in the same manner.

24. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. (EP 517542) as applied to claim 9 above, and further in view of Lee et al. (6,351,067).

25. Concerning claim 14, Noguchi et al. describe the organic electroluminescent device discussed above, but are silent on the use of an inorganic compound layer between at least on of the electrodes and the organic film layer.

26. Lee et al. described organic electroluminescent devices with improved luminescent efficiency by the inclusion of an inorganic buffer layer in the hole injecting or electron injecting regions. (abstract)

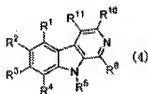
27. Given this teaching, it would have been obvious to one of ordinary skill in the art to use the inorganic buffer layer, as described by Lee et al. between the thin film layer and the electrode of the device described by Noguchi et al., for the purpose of improving the luminescent efficiency of the device.

### ***Double Patenting***

28. Claims 1, 9-13, and 15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3 and 11 of copending Application No. 11/480463. Although the conflicting claims are not identical, they are not patentably distinct from each other because Application No. 11/480463

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claims an organic electroluminescent device comprising an anode, a cathode and a thin film layer comprising at least one layer, where at least one of the layers comprises a compound of the structure shown below (claim 3), at least one layer of which comprises a host for a phosphorescent dopant. Any of the layers can comprise the compound shown below. (claim 1) The layers include a light emitting layer (layer 2) (claim 11), and the first and third contact the emitting layer (being therefore either a hole transporting layer, or an electron transporting layer, depending on which side of the emitting layer each of the other two layers is deposited). The compound of claim 1 of the current application falls within the scope of the structure of claim 3 of 11/480463.



This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 9-13, and 15 are directed to an invention not patentably distinct from claims 1 and 3 of commonly assigned Application No. 11/480463. See discussion above.

The U.S. Patent and Trademark Office normally will not institute an interference between applications or a patent and an application of common ownership (see MPEP Chapter 2300). Commonly assigned Application No. 11/480463, discussed above, would form the basis for a rejection of the noted claims under 35 U.S.C. 103(a) if the

commonly assigned case qualifies as prior art under 35 U.S.C. 102(e), (f) or (g) and the conflicting inventions were not commonly owned at the time the invention in this application was made. In order for the examiner to resolve this issue, the assignee can, under 35 U.S.C. 103(c) and 37 CFR 1.78(c), either show that the conflicting inventions were commonly owned at the time the invention in this application was made, or name the prior inventor of the conflicting subject matter.

A showing that the inventions were commonly owned at the time the invention in this application was made will preclude a rejection under 35 U.S.C. 103(a) based upon the commonly assigned case as a reference under 35 U.S.C. 102(f) or (g), or 35 U.S.C. 102(e) for applications pending on or after December 10, 2004.

### ***Conclusion***

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prior Art cited in the International Search Report has been considered, but in light of the species election, has not been used in this action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL E. NELSON whose telephone number is (571)270-3453. The examiner can normally be reached on M-F 7:30am-5:00pm EST (First Friday Off).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael E. Nelson  
Examiner  
Art Unit 1794

/Callie E. Shosho/  
Supervisory Patent Examiner, Art Unit 1794